

**PORTABLE VAPOR INHALER****Priority**

[001] The present invention claims priority from prior U.S. Provisional Patent Application Serial No. 60/432,119, filed on December 9, 2002.

**5 Technical Field**

[002] This invention relates to an application for decongesting nasal passages. More particularly, this invention relates to a portable vapor inhaler that helps to improve breathing by decongesting nasal passages.

**Background**

10 [003] Nasal congestion is a significant problem and a characteristic symptom of various conditions, including allergies and colds. Nasal congestion interferes with breathing and makes the sufferer of congestion uncomfortable. Relieving nasal congestion can help the sufferer of a cold or allergy feel better, allow them to breathe more easily, and to function better during work or recreation.

15 [004] One way to treat nasal congestion can be with pharmaceutical materials. Treating nasal congestion with pharmaceutical materials, however, may have deleterious effects. Pharmacological side effects may leave a person feeling listless, sleepy, excited or inattentive.

[005] One traditional non-pharmaceutical method of relieving nasal congestion is  
20 humid vapor therapy. Humid vapor therapy can be provided by a steam vaporizer. A steam vaporizer provides highly moistened air that can be inhaled to drain accumulated mucus from nasal passages and sooth swollen, irritated nasal tissues. Steam vaporizers often add decongesting fragrance materials such as menthol or camphor to the humidified air to increase the effectiveness of inhaling this treated air.

25 [006] One significant problem with steam vaporizers, or similar devices, is the fact that they are not portable. Hindrances to portability include size, weight and electrical requirements. Attempts to provide for similar benefits in portable form have taken two forms. In one approach, the decongesting fragrances are simply placed in a tube or medium and inhaled. This approach lacks the benefits of humidified air, which is  
30 especially beneficial during cold and allergy seasons when the ambient air tends to naturally lack humidity. The second approach is to devise miniaturized equipment that forces ambient air through or over water solutions, perhaps warmed by resistance heating or ultrasonics. These approaches have also proved unreliable.

**Disclosure of the Invention**

[007] The present invention is a portable vapor inhaler for improving the breathing of those suffering from nasal congestion. One embodiment of the present portable vapor inhaler invention includes an effervescent composition and a vapor-concentrating lid for attachment to a standard sized cup.

[008] A second embodiment includes a water reservoir, an attachable vapor-concentrating lid, and an effervescent composition, which, when added to the water, provides a positive internal pressure in the reservoir, forcing humidified air from the vapor-concentrating lid.

[009] In another embodiment the portable vapor inhaler includes a vapor-concentrating lid and water reservoir as one complete unit.

[010] In yet another embodiment, the effervescent composition may further contain decongesting fragrance materials to enhance the decongesting effect.

[011] The present invention further may include a portable vapor inhaler comprising a reservoir, a vapor-concentrating lid that is removably attachable to the reservoir, and an effervescent composition.

[012] In yet another embodiment, the system for the inhalation of humidified vapor comprises a reservoir, a vapor-concentrating lid that is removably attachable to the reservoir, and an effervescent composition.

[013] The present invention also includes a method for the inhalation of humidified vapor comprising filling a reservoir with hot water, adding an effervescent composition to the hot water, the effervescent composition causing to be released an amount of gas such that a positive vapor pressure is created in the reservoir, connecting a vapor-concentrating lid to the reservoir, and breathing an amount of humidified air.

[014] The present invention also includes a method for treating cold symptoms comprising filling a reservoir with hot water, adding an effervescent composition to the hot water, the effervescent composition causing to be released an amount of gas such that a positive vapor pressure is created in the reservoir, connecting a vapor-concentrating lid to the reservoir, and breathing an amount of humidified air.

[015] The present invention also includes a method for treating allergy symptoms comprising filling a reservoir with hot water, adding an effervescent composition to the hot water, the effervescent composition causing to be released an amount of gas such that a positive vapor pressure is created in the reservoir, connecting a vapor-concentrating lid to the reservoir, and breathing an amount of humidified air.

[016] The present invention also includes a method for decongesting nasal passages comprising filling a reservoir with hot water, adding an effervescent composition to the hot water, the effervescent composition causing to be released an amount of gas such that a positive vapor pressure is created in the reservoir, connecting a vapor-concentrating lid to the reservoir, and breathing an amount of humidified air.

**Brief Description of the Drawings**

[017] FIG. 1 is a perspective view of the portable vapor inhaler of the present invention.

[018] FIG. 2 is a perspective view of the vapor-concentrating lid of the vapor inhaler of FIG. 1.

[019] FIG. 3 is a perspective view of another embodiment of the vapor-concentrating lid of FIG. 2.

**Detailed Description**

[020] The present invention will be herein described with reference to FIGS. 1-3. As illustrated in FIG. 1, the present invention is a vapor inhaler 10, including a vapor-concentrating lid 12, an effervescent composition 14, and a reservoir 16. The vapor-concentrating lid 12 is removably engagable to the top of the reservoir 16.

[021] As illustrated in FIG. 2, the vapor-concentrating lid 12 includes a central cover portion 18, a rim engaging portion 20, a shaped wall 22, and a central depressed area 24. The central depressed area 24 further includes one or more vents 26 therein. The shaped wall 22 may further include a shaped depression 28. The wall 22 may be several shapes, such as frusto-conical or dome shaped. The combination of the central depressed area 24 and the shaped depression 28 preferably form an ergonomic shape which allows the user to place his or her nose in close contact with the one or more vents 26, but also protects a majority of the user's face, including his or her eyes, mouth, and skin, from direct exposure to the vapor as it escapes from the one or more vents 26 (as further described below). The vapor-concentrating lid 12 is of a size such that the combination of the central depressed area 24 and the shaped depression 28 conforms approximately to the size and shape of the user's facial structure around the nose, hereinafter referred to as the nasal area. Various shaped vapor-condensing lids 12 are shown in FIGS. 2-5.

[022] The vapor-concentrating lid 12 is designed to concentrate the emitted air and vapor at the vents 26, and to emit the humidified air and vapor through the vents 26 in the vapor-concentrating lid 12. The vapor-concentrating lid 12 should be of lightweight construction but durable enough to remain intact after attaching to the reservoir. The vapor-concentrating lid 12 may be made from a variety of materials, including, but not limited to, thermoplastics such as polystyrene, polypropylene, and polyethylene terephthalate (PET), or from a variety of synthetic or natural rubbers. Various vapor condensing lids 12 illustrated in FIGS. 2-3 were produced from thin polystyrene plastic using typical vacuum thermoforming techniques. The vapor-condensing lid 12 weighs about 5 grams.

[023] The vapor-concentrating lid 12 should fit tightly onto the reservoir 16, either by close friction fit or threaded screw attachment, so as to form a substantially fluid impermeable barrier. In one embodiment, the rim engaging portion 20 of the vapor-concentrating lid 12 is substantially round such that it can be fitted over a pre-determined and standard sized hot beverage cup. Alternatively, the vapor-concentrating lid 12 may be sized such that it fits over a variety of common cup sizes, such as standard styrofoam

or paper cups. In such an embodiment it is not necessary for a reservoir 16 to be provided to the user. In alternative embodiments, the reservoir 16 can be provided along with the vapor-condensing lid 12. In such alternative embodiments the vapor-concentrating lid 12 is sized and shaped to match the opening of the provided reservoir 16.

5 [024] The vents 26 may be one or more relatively small, substantially centrally located openings, with the desired effect of concentrating the decongesting vapor into an area smaller than the opening of the reservoir. In further embodiments, and as illustrated in FIG. 3, the vents 26 may be one or more larger openings of a variety of shapes. As long as the vents 26 allow the user to breathe or inhale some amount of the humid air  
10 from the vapor inhaler 10, the vents 26 are effective for the desired purpose.

[025] As previously described, the reservoir 16 may be a standard sized beverage cup designed to contain hot beverages, such as a styrofoam cup, a plastic cup, a cardboard cup, a paper cup, or a ceramic coffee cup. Such a cup, as illustrated in FIG. 1, normally includes a generally circular opening 32 that includes a lip 34 around the circumference.  
15 The cup may also include a bottom 36 and a sidewall 38 whereby an interior reservoir 40 is formed. As may be appreciated, the interior reservoir 40 includes, after the hot water is placed therein, a water repository 42 and an air repository 44. The air repository 44 is where an amount of humidified vapor collects in the reservoir 16 before being inhaled.

[026] Where the reservoir 16 is provided, the reservoir 16 should be relatively small  
20 in size so that it can be easily carried, held, stored and filled with water. The reservoir 16 should also be of minimal weight to achieve its function. It should hold a reasonable amount of water, and ideally, when filled with hot water, it should provide sufficient insulation to keep the water hot during the period of use.

[027] Some typical specifications of the reservoir 16 are as follows.

[028]

**TABLE 1**

	<b><u>General Requirements</u></b>		<b><u>Preferred Requirements</u></b>	
	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>
<b>Volume</b>	30 mL	2 L	100 mL	1 L
<b>Height</b>	5 cm	30 cm	8 cm	15 cm
<b>Width</b>	2 cm	20 cm	5 cm	10 cm
<b>Weight</b>	None	500 g	None	50 g
<b>Material</b>	Insulating plastic, fiber or foam		Same	
<b>Shape</b>	Any		Traditional drinking cup	

[029] The effervescent composition 14 provides the positive pressure to the humidified air by bubbling released effervescent gases through the hot water in the reservoir 16. Effervescent compositions are commonly used in products as diverse as antacids and denture cleaners and any such system may be utilized effectively in the present invention. Ideally, the effervescent composition 14 would also contain decongesting fragrance materials such as camphor and menthol. The fragrance is preferably perceptible by olfaction for at least about 10 minutes after being placed in water having a temperature of at least about 100° F. A general example of possible specifications for the effervescent composition 14 is given below.

[030]

**TABLE 2**

	<b><u>General Requirements</u></b>		<b><u>Preferred Requirements</u></b>	
	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>
<b>Weight</b>	0.1 g	100 g	1 g	5 g
<b>Gas Generated</b>	1 mL	10 L	100 mL	1 L
<b>Dissolution Time</b>	1 sec	10 min	1 min	2 min

[031] One effervescent composition 14 was made from the following formula using common mixing equipment and techniques.

[032]

**TABLE 3**

<b><u>Ingredient</u></b>	<b><u>Wt%</u></b>
Sorbitol	20 – 30 % w/w
Citric acid	20 – 30 % w/w
Sodium bicarbonate and bicarbonate	30 – 40 % w/w
Polyethylene glycol	3 % w/w
Eucalyptus oil	2.3 % w/w
Sodium benzoate	2 % w/w
Menthol	1.7 % w/w
Magnesium oxide	1 % w/w
FD&C Yellow #5 Aluminum Lake (aka Yellow 5 Lake)	0.04 % w/w
FD&C Blue #1 Aluminum Lake (aka Blue 1 Lake)	0.02 % w/w

[033] An effervescent composition 14 according to Table 3 was blended and then made into tablets of about 3.30g to about 3.65g each. The tableting is preferably done at lower humidity levels. For example, at 70° F, the relative humidity is preferably below 20% and more preferably is below 15%. The tablets formed had a green and white mottled/speckled appearance, a diameter of approximately .833 inches, and a thickness less than about .290 inches. The tablets are pressed using conventional tableting techniques, and are preferably pressed to an initial hardness of between about 7 to about 10 kiloponds. After 24 hours the tablets will reach a relatively stable hardness of 18 to 25 kiloponds using a Schleuniger 6D hardness tester or equivalent. The tablet of the effervescent composition 14 according to Table 3 takes between about 30 and about 150 seconds to dissolve, averaging about 100 seconds, when placed in 125 mL of water at 100° F and between about 30 and about 80 seconds, averaging about 50 seconds, to dissolve when placed in 125 mL of water at 140° F. After 48 hours or more after tableting the tablets will have a friability less than about 2% using a Vankel friabilator or equivalent.

[034] A second effervescent composition 14 was made from the following formula using common mixing equipment and techniques.

**TABLE 4**

<b><u>Ingredient</u></b>	<b><u>Wt%</u></b>
Citric Acid.....	58%
Sodium Bicarbonate.....	33%
Sodium Carbonate.....	3%
Aminoacetic acid .....	2%
Flavor .....	2%
Menthol.....	1%
Eucalyptus Oil.....	0.5%
Camphor.....	0.3%
Excipients.....	.2

This effervescent composition 14 according to Table 4 was adapted from: Pharmaceutical Dosage Forms: Tablets, Volume I, Lieberman HA, Lachman L, Schwartz JB, Eds, Marcel Dekker, Inc, New York, 1989. The effervescent composition 14 was  
 5 then compacted into tablets weighing approximately three grams each. The tablets were also found to work effectively for the desired purpose.

[035] The examples of the effervescent compositions 14 may also be used in powder or other forms. Other forms would have different characteristics from a tablet that might be advantageous in some circumstances. Such as, for example, adhering the composition  
 10 to a water soluble backing.

#### **General Use**

[036] In use, the reservoir 16 is filled with hot water of a pre-determined temperature. Preferably the water temperature will be approximately 80 °F to 200 °F, and more preferably from 90 °F to 110 °F. The air repository 44 takes up the space of the  
 15 reservoir 16 not occupied by the water repository 42. The vapor-concentrating lid 12 is securely fitted to the reservoir 16 by engagement of the rim engaging portion 20 over the lip 34 of the reservoir 16. The vapor-concentrating lid 12 should be secured to the reservoir 16 such that the vapor-condensing lid 12 and the reservoir 16 form a substantially fluid impermeable barrier. The humidified vapor then begins collecting in  
 20 the air repository 44 under the vapor-condensing lid 12. The effervescent composition 14, in either powder or tablet form, is then placed into the water through vents 26.



[037] As gases bubble through the water, positive pressure begins to build in the air repository 44. The positive pressure forces the humidified vapor out of the one or more vents 26. At this time, the user places his or her facial area in close contact with the vapor-condensing lid 12 such that the depressed area 24 and the shaped depression 28 loosely engage the nasal area of the user's face. The user then breathes the humidified vapor for a desired period of time or until the effervescent composition 14 stops forcing humidified vapor through the vents 26.

[038] As may be appreciated, the steps for utilizing the present invention can be carried out through a variety of different ways. For example, the effervescent composition 14 could be already present in the reservoir 16 and simply activated by the addition of water to the reservoir 16. The composition 14 could be adhered to the bottom of the reservoir 16 or applied as a film to the inner surface of the reservoir 16. Additionally, the composition 14 can be dropped into the reservoir 16 before or after the vapor-condensing lid 12 is fitted onto the reservoir 16 and before or after the water is added thereto.

#### **Example 1**

[039] In one specific example of the current invention, a common Dixie® PerfecTouch™ (Georgia-Pacific Consumer Products, Atlanta, GA) 12 ounce paper coffee cup is used as the reservoir 16. This cup meets the preferred characteristics described above in that it is about 12 centimeters tall, has a total volume of about 360 milliliters, weighs about 10 grams, has a top opening of about 9 centimeters, is easily filled, held and carried, and is sufficiently insulated to keep liquids hot for as long as an hour. The reservoir 16 is then filled with 125 milliliters of very hot tap water, with a temperature of about 122 °F. A vapor-concentrating lid 12 is placed thereon by gently pressing the vapor-condensing lid 12 against the top of the reservoir 16. The effervescent composition 14 of Table 4 was added and the humidified vapors were inhaled. Various parameters for the invention, before and after use, are listed below.

[040]

**TABLE 5**

Empty Vapor Inhaler Weight.....	18 g
Water Filled Vapor Inhaler Weight...	143 g
Initial Water Temperature.....	50°C

Water Temperature after 10 minutes.. 45°C  
Tablet Dissolution Time..... 70 sec  
Weight Lost During Dissolution..... 0.2 g  
Equivalent Amount of CO<sub>2</sub> Evolved.. 100 mL

### **Alternative Embodiments**

[041] In one alternative embodiment, the reservoir 16 may be a collapsible membrane that can be fitted to the vapor-concentrating lid 12, filled with hot water and placed inside of a cup or other container that will insulate the hot water and allow the user to hold the inhaler 10. The flexible membrane may have a stiff rim for attachment of the vapor-condensing lid 12, but otherwise be flexible enough to conform to a variety of container shapes and sizes. Such an embodiment would have the advantages of having a small size, being lightweight, being transportable, and being economically constructed.

[042] In still further embodiments, the reservoir 16 and the vapor-concentrating lid 12 may be substantially one piece. In such an embodiment, the one piece reservoir 16 and the vapor-concentrating lid must have a closeable opening sufficient to fill the reservoir 16 with hot water and to also place the effervescent composition 14 therein. Alternatively, the effervescent composition 14 may be placed in the reservoir 16 prior to completely assembling the one-piece vapor inhaler 10.

[043] In still further embodiments, the combination of the vapor-condensing lid 12, reservoir 16, and composition 14 may be a one use system. In such a system, the effervescent composition 14 may be already affixed to an interior of the reservoir 16 such that simply filling the reservoir 16 activates the effervescent action.

[044] As an alternative to effervescent compositions 14, or in addition to them, any composition or ingredient capable of generating an internal positive pressure within the reservoir may be used. For example, utilization of carbonated liquids to create a positive pressure in the reservoir 16 could be incorporated.

[045] In further embodiments, the reservoir could be lined with a non-insulating material such as aluminum foil to protect the insulating material from contact with the fragrance materials and effervescent solution.

[046] The invention of this application is described above both generically and with regard to specific embodiments. A wide variety of alternatives known to those of ordinary skill in the art can be selected within the generic disclosure. The examples

provided herein are not to be limited by the examples, but rather, the claims are considered to provide the complete scope of the invention.